CLAIMS

1. A method for detecting a quantitative measure of a physiologic state of a human myocardium or coronary artery, the method comprising:
   a) attaching at least one electrode pair to the myocardium;
   b) recording baseline measurements of the mean myocardial electrical impedance and computing the variance of the myocardial electrical impedance between each electrode pair;
   c) computing a baseline value of mean myocardial electrical impedance from the baseline measurements;
   d) periodically measuring mean myocardial electrical impedance values between each electrode pair over an interval of time and storing data representing the impedance values as a function of time; and
   e) after the mean myocardial electrical impedance changes from the computed baseline value by at least the measured variance, diagnosing the extent of change in the myocardial physiologic state as a continuous, smooth, function of the extent of change, or rate of change, of the periodically measured myocardial electrical impedance from the baseline value.

2. A method in accordance with claim 1 wherein:
   a) the physiologic state is the extent of ischemia of a portion of the myocardium; and
   b) after the mean myocardial electrical impedance between the electrode pairs rises above a value equal to the arithmetic sum of the baseline myocardial electrical impedance and the variance, myocardial ischemia severity is diagnosed as a continuous, smooth, increasing function of the extent of the rise of the mean myocardial electrical impedance above the baseline value.

3. A method in accordance with claim 1 wherein:
   a) the physiologic state is the extent of stenosis pre-existing in a coronary artery;
   b) each electrode pair is attached to the myocardium in the region of the myocardium perfused by the coronary artery;
   c) the coronary artery is occluded proximally after recording the baseline measurements; and
   d) after the mean myocardial electrical impedance between the electrode pair rises above a value equal to the arithmetic sum of the baseline myocardial electrical impedance and the variance, the extent of stenosis pre-existing in the coronary artery is diagnosed as a continuous, smooth, decreasing function of the extent of rise of the mean myocardial electrical impedance above the baseline value.

4. A method in accordance with Claim 3 wherein the continuous, smooth, decreasing function is substantially:

$$\%\text{stenosis} = -2.89 \times \%\text{MEI} + 410.044,$$

wherein

%stenosis is the percent pre-existing blockage in the coronary artery and

%MEI is the increase of the mean myocardial electrical impedance above the baseline value expressed as a percent.

5. A method in accordance with claim 1 wherein:
   a) the physiologic state is the extent of reperfusion of a portion of the myocardium; and
   b) after the mean myocardial electrical impedance between the electrode pairs declines below a value equal to the arithmetic difference of the baseline myocardial electrical impedance and the variance, the myocardial reperfusion level is diagnosed as a continuous, smooth increasing function of the extent of the decline of the mean myocardial electrical impedance below the baseline value.

6. A method in accordance with Claim 5 whereby the efficacy and level of success of coronary artery bypass surgery is diagnosed as the extent of reperfusion.

7. A method in accordance with claim 1 wherein:
   a) the physiologic state is the extent of myocardial tissue rejection following heart transplantation; and
   b) after the mean myocardial electrical impedance between the electrode pair rises above a value equal to the arithmetic sum of the baseline myocardial electrical impedance and the variance, the myocardial tissue rejection severity is stratified as a continuous, smooth, increasing function of the rise of the myocardial electrical impedance above the baseline value.

8. A method in accordance with claim 1 wherein:
   a) the physiologic state is the effectiveness of cardioplegia of the myocardium during on-pump coronary artery bypass graft surgery;
   b) the method further comprises, after recording the baseline measurements, placing the myocardium on bypass and applying a selected type of cardioplegia;
   c) after the mean myocardial electrical impedance between the electrode pairs rises above a value equal to the arithmetic sum of the baseline myocardial electrical impedance and the variance, the effectiveness of the cardioplegia is diagnosed as a continuous, smooth, decreasing function of the rise of the myocardial electrical impedance rises above the baseline value.

9. A method in accordance with claim 1 wherein:
   a) the physiologic state is the effectiveness of ischemia preconditioning of the myocardium during coronary artery bypass graft surgery;
   b) the baseline measurements are recorded immediately prior to placing the heart on bypass;
   c) the method further comprises, after preconditioning and the beginning of the ischemic period of surgery, calculating the rate of rise (ohms/minute) of the myocardial electrical impedance; and

d) the diagnosing step more particularly comprises diagnosing the effectiveness of the ischemia preconditioning as a continuous, smooth, decreasing function of the extent of the rate of rise of the myocardial electrical impedance.